

A CLASSROOM FULL OF WATER

Teaching Guidelines

Subject: Mathematics

Topics: Measurement (volume)

Grades: 3 - 6

Concepts:

- Volume
- Unit
- Cubic foot

Knowledge and Skills:

- Can solve complex, multi-step problems
- Can measure lengths
- Can find the volume of a rectangular prism by computation
- Can convert between cubic feet and gallons

Materials

- a gallon container
- a box with a volume of 1 cubic foot
- tape measure or yardstick

Procedure:

This activity should be done with the class as a whole.

Distribute the handout and make sure students understand the idea of the room being filled with water. Have a gallon container available for the students to look at as they estimate the capacity of the room.

Ask the students to make their estimates and write them down.

Copyright © The FUTURES Channel, 2000. Permission is granted to transmit and copy this document for educational purposes so long as it is not altered and not sold. No page of this page which is not the entire page may be copied or transmitted in any form, physical or electronic, for any purpose, without express written permission from The Futures Channel.

Tell students they are going to use mathematics to find out how many gallons of water it would take to fill the room. First they have to find the dimensions of the room—the length, width and height.

To measure the length and width of the room, you can use a tape measure or a yardstick, but a more instructive approach would be to measure the length of a student's step (in feet), and then have him or her walk off the length and width of the room.

This procedure will reinforce the concept of “unit”, since the student's step length is being used as a unit of length measurement. It also presents an opportunity to discuss the conversion of units, since you multiply to convert the student's step length into feet.

You can extend this activity by separating the class into teams of two students, having each team carry out this procedure, and then comparing the answers, perhaps by finding the average, median, range and/or mode.

One way to find the height is for you to touch the ceiling with a broomstick or similar object, and add the length of the broomstick to the height at which you are holding it. Or students can estimate the height based on your own height.

Review the concept of “cubic foot” as a unit of volume. Show students a box which has a volume of 1 cubic foot, and be sure they understand that multiplying the length, width and height measurements of the room will tell how many of those boxes would fit in the room. Have students do this calculation.

Once you have calculated the volume of the room in cubic feet, remind the students that the original question asked for the number of *gallons*. Tell them that there are about 7.5 gallons in each cubic foot, and ask students how they would use this fact to find out how many gallons would fit in the total number of cubic feet that they found for the room. Be sure all students understand why multiplication is the appropriate operation. Then make this calculation and compare the answer to the students' original estimates.

A Classroom Full of Water

What if your classroom were filled with water? How many gallons of water would it hold?

Look at a gallon container. Then estimate how many gallons it would take to fill your classroom. Write your estimate here:

_____ gallons.

With your class, measure the size of your classroom, in feet.

Length: _____ feet

Width: _____ feet

Height: _____ feet

What is the volume of the room, in cubic feet? _____

One cubic foot is the same volume as 7.5 gallons. How many gallons would fill your classroom? _____

Explain your answer.

Words:

Three dimensional: Having length, width, and height.

Volume: The amount of space inside a three dimensional shape.